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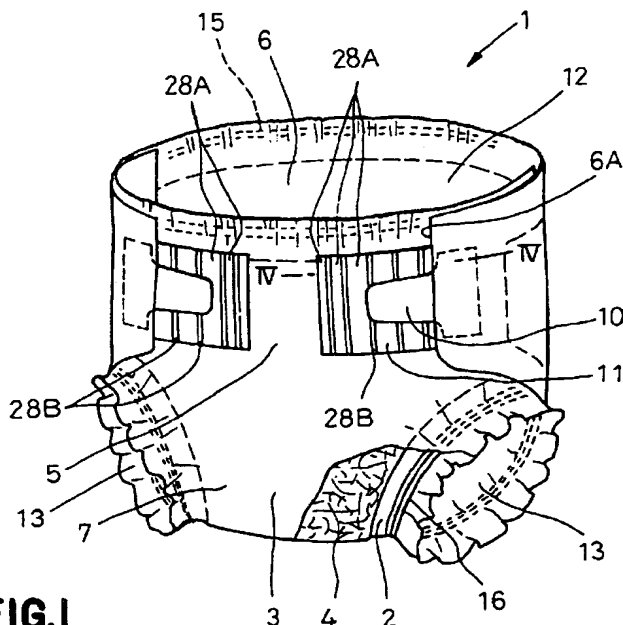
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**(54) Disposable diaper having fastening means**

(57) A disposable diaper (1) has fastening means comprising tape fasteners (10) and a receiving sheet (11). The tape fasteners (10) extend outward from transversely opposite side edges of a rear region (6) of the diaper (1). These tape fasteners (10) are releasably fas-

tened to the receiving sheet (11) intermittently bonded by means of adhesive at sections (2BA) to an outer surface of a backsheet (3) of the diaper (1). A color of the adhesive can be seen through the receiving sheet (11) and serves as a positioning indicator when the tape fasteners (10) are fastened to the receiving sheet (11).



**FIG. 1**

## Description

The present invention relates to a disposable diaper having fastening means for connecting a front waist and a rear waist of the diaper to each other.

Japanese Laid-Open Utility Model Application No. Hei7-22725 discloses a disposable diaper having tape fasteners extending outward from transversely opposite side edges of a rear region of the diaper and adapted to be releasably fastened to receiving sheets bonded to an outer surface of a front region of the diaper, wherein graduations are marked on the receiving sheets circumferentially around the waist of the diaper. These graduations serve as a positioning indicator when the tape fasteners are fastened to the receiving sheets so that these graduations may be utilized to maintain a constant degree of tightening force around a wearer's waist.

The receiving sheets are generally made of a plastic film or nonwoven fabric and the graduations are printed on surfaces of these receiving sheets. Particularly in the case of a baby's diaper, materials used for the diaper should be carefully selected from the viewpoint of sanitary security, since babies often put their fingers or various other things into their mouths. While hygienically innocuous ink is used for printing the graduations, it is desired to avoid that the ink might be in contact with a baby's mouth.

Accordingly, it is a principal object of the invention to eliminate a need for printing the graduations and to prevent regions occupied by the receiving sheets from becoming unacceptably rigid by utilizing a pattern in which an adhesive for bonding the receiving sheets to the front region is applied as the graduations.

The object set forth above is achieved, according to the invention, by a disposable diaper having fastening means comprising tape fasteners and a receiving sheet, the tape fasteners extending outward from transversely opposite side edges of a rear region of the diaper, and the receiving sheet being bonded by means of adhesive to an outer surface of a front region of the diaper so that the tape fasteners may be releasably fastened to the receiving sheet, wherein the adhesive is intermittently disposed circumferentially around a waist region of the diaper, the receiving sheet and the adhesive have relatively different colors, and the receiving sheet has a light transmissivity allowing the color of the adhesive to be seen through the receiving sheet.

The invention will now be described by way of example with reference to the accompanying drawings, wherein:-

Fig. 1 is a perspective view, partially broken away, of a disposable diaper in accordance with one embodiment of the invention as put on a wearer's body;

Fig. 2 is a plan view of a tape fastener;

Fig. 3 is a sectional view taken along a line III-III in

Fig 2; and

Fig. 4 is a sectional view taken along a line IV-IV in Fig. 1.

Fig. 1 is a partially broken away perspective view showing a diaper 1 as put on a user's body. As shown, the diaper 1 comprises a liquid-permeable topsheet 2, a liquid-impermeable backsheet 3 and a liquid-absorbent core 4 disposed between these two sheets 2, 3. The diaper 1 has a front region 5, a rear region 6 and a crotch region 7 longitudinally extending between these two regions 5, 6. Tape fasteners 10 laterally extend outward from transversely opposite edges 6A of the rear region 6, respectively, and are adapted to be releasably fastened to the front region 5 by engaging respective inner surfaces of these fasteners 10 with the receiving sheets 11 provided on an outer surface of the front region 5 at its transversely opposite edges. The diaper 1 is formed with a waist-opening 12 and a pair of leg-openings 13 when the front and rear regions 5, 6 are connected by means of the tape fasteners 10 to each other in such a manner as described just above. The respective openings 12, 13 are circumferentially provided with elastically stretchable members 15, 16, respectively, which are bonded to at least one of respective inner surfaces of the top-and backsheets 2, 3.

The tape fastener 10 of which the inner side is shown in Fig. 2 comprises a soft sheet member 20 formed of a nonwoven fabric made of thermoplastic synthetic fibers and fastening members 21 made of a plastic material having a rigidity higher than that of the sheet member 20. The fastening members 21 extend between upper and lower edges 20A, 20B of the sheet member 20 at locations spaced from each other, i.e., at a location adjacent a base end 20C and at a location adjacent a free end 20D with respect to the associated edge of the rear region 6 from which the tape fastener 10 laterally extends outward, and are fixedly bonded to the sheet member 20 by means of an adhesive agent 22A and heat-sealing spots 26. The sheet member 20 is provided between the two fastening members 21 with an adhesive region 22 carrying the adhesive agent 22A exposed thereon. The free end 20D of the sheet member 20 is non-adhesive and serves as pick-up means.

Fig. 3 is a sectional view taken along a line III-III in Fig. 2. As shown, a part of the sheet member 20 is bonded to respective inner surfaces of the top-and backsheets 2, 3 by means of hot melt adhesive 27. The paired fastening members 21 spaced from each other are bonded to an upper surface of the adhesive agent 22 and heat-sealed to the sheet member 20 by means of the heat-sealing spots 26. Each fastening member 21 corresponds to a plurality of hook elements of so-called surface fastener well known by the trade name of Velcro or Magic Tape and made of nylon or other plastics. Each receiving sheet 11 to which the respective fastening members 21 are fastened comprises a bulky nonwoven

fabric made of crimped fibers. The receiving sheet 11 has a color different from that of adhesive 30 as will be described later and a light transmissivity allowing the color of the adhesive 30 to be seen therethrough. The receiving sheet 11 corresponds to a plurality of loop elements of said surface fastener. The receiving sheet 11 has a plurality of vertically extending stripes as seen in Fig. 1 so that each of these stripes may be used as a positioning indicator when the fastening members 21 are engaged with the respective receiving sheets 11.

As will be apparent from Fig. 4 which is a sectional view taken along a line IV-IV in Fig. 1, the striped pattern is obtained by bonding the receiving sheet 11 to the backsheet 3 with use of colored hot melt adhesive 30 wherein the nonwoven fabric is applied with the colored hot melt adhesive 30 in the desired striped pattern. Referring to Fig. 4, sections 28A are bonded to the backsheet 3 and present a color of the hot melt adhesive therethrough while sections 28B are not bonded to the backsheet 3 and present a color of the receiving sheet itself. The pattern in which the receiving sheet 11 is applied with the hot melt adhesive and which serves as the positioning indicator may be selected from a group of appropriate patterns other than the striped pattern as adopted by the illustrated embodiment, so far as the adhesive is applied to the receiving sheet 11 intermittently along the waist line. Such intermittent application of adhesive may be performed over a limited extent predetermined for fastening of the member 21 and a peripheral region of the nonwoven fabric extending outside such predetermined extent may be, for example, continuously bonded to the backsheet 3. The pattern in which the adhesive 30 is applied and the shape of the sheet member 20 are preferably symmetric with respect to a transversely center line (not shown) of the diaper 1. To enhance the function of the adhesive application pattern as the indicator, the respective stripes may have widths progressively changing in the circumferential direction.

To implement the invention, a soft plastic film may be employed rather than the nonwoven fabric as a material for the sheet member 20 and an adhesive tape fastener may be employed rather than the fastening tape 21 as the tape fastener 10. The receiving sheet 11 associated with the adhesive tape fastener 10 is preferably made of a plastic film which must, obviously, allow the color of the hot melt adhesive to be seen therethrough. The receiving sheets 11 for both side edges of the front region 5 in the illustrated embodiment may be replaced by a single sheet which is continuous circumferentially around a wearer's waist. It should be understood that not only the adhesive agent such as hot melt adhesive but also a heat-sealing technique may be employed for bonding of the respective members, the latter being useful for the members made of a heat-sealable material.

In the diaper according to the invention, the receiving sheets to which the tape fasteners are fastened are

intermittently bonded to the outer surface of the backsheet and the bonded regions thereof can be seen through the receiving sheets so as to serve as the positioning graduations when the tape fasteners are fastened to the respective receiving sheets. The adhesive used for such bonding is covered with the receiving sheets and therefore reliably prevented from being in contact with a baby's hands and mouth, assuring sanitary security of this diaper. According to the invention, application of the adhesive makes printing of the graduations unnecessary and correspondingly allows the manufacturing cost to be reduced. Non-bonded regions generated from intermittent application of the adhesive do not affect air-permeability of the backsheet and thus significantly improve the air-permeability of the diaper as a whole over the conventional case in which such receiving sheets are bonded over the entire area thereof to the backsheet. Intermittent application of the adhesive is advantageous also in that the regions occupied by the receiving sheets do not cause unacceptably high rigidity and this advantageous effect is particularly evident when the receiving sheets are made of a nonwoven fabric.

## Claims

1. A disposable diaper having fastening means comprising tape fasteners and a receiving sheet, said tape fasteners extending outward from transversely opposite side edges of a rear region of the diaper, and said receiving sheet being bonded by means of adhesive to an outer surface of said front region so that said tape fasteners may be releasably fastened to said receiving sheet, characterised in that said adhesive is intermittently disposed circumferentially around a waist region of said diaper, said receiving sheet and said adhesive have relatively different colors, and said receiving sheet has a light transmissivity allowing the color of said adhesive to be seen through said receiving sheet.
2. The disposable diaper as claimed in Claim 1, wherein said adhesive is disposed so as to form a pattern comprising a plurality of stripes extending vertically of the diaper.
3. The disposable diaper as claimed in Claim 2, wherein said pattern of stripes are formed symmetrically with respect to a center line transversely dividing said diaper in two halves.
4. The disposable diaper as claimed in Claim 1, 2 or 3, wherein each of said tape fasteners comprises a plurality of hook elements.
5. The disposable diaper as claimed in Claim 4, wherein said receiving sheet comprises a plurality

of loop elements.

6. The disposable diaper as claimed Claim 1, 2 or 3, wherein each of said tape fasteners is made of adhesive tapes.

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7. The disposable diaper as claimed in Claim 6, wherein said receiving sheet is made of a plastic film.

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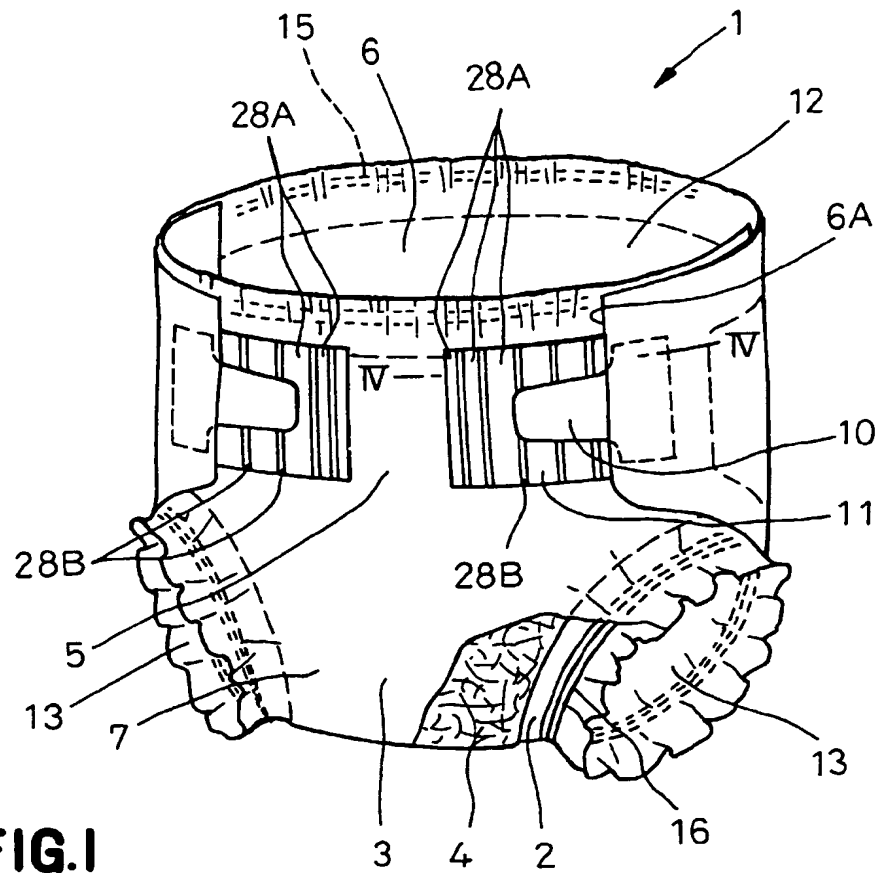
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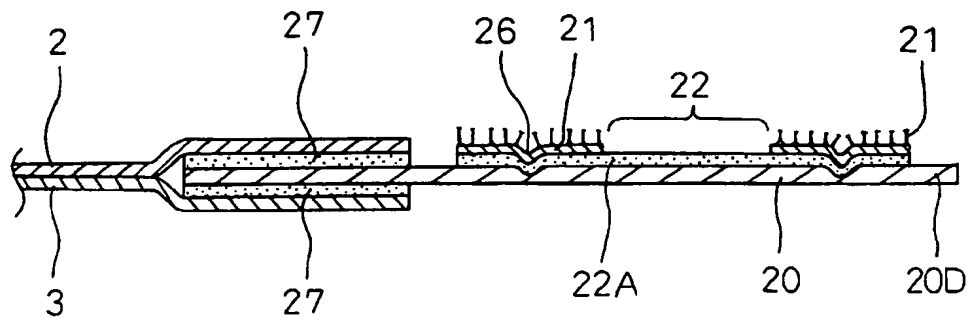
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**FIG. 1**



**FIG. 3**

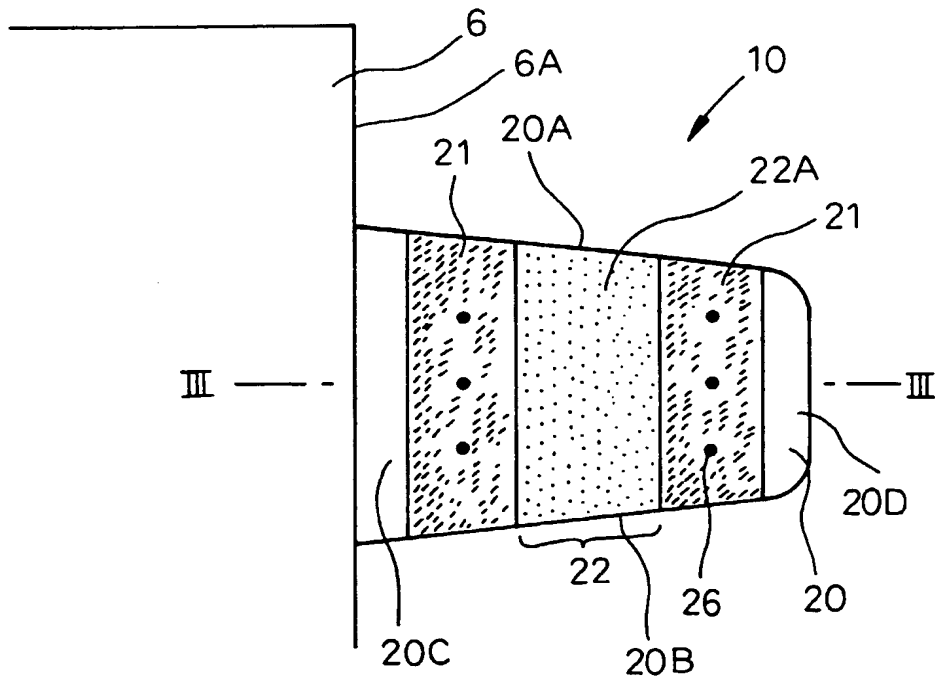


FIG. 2

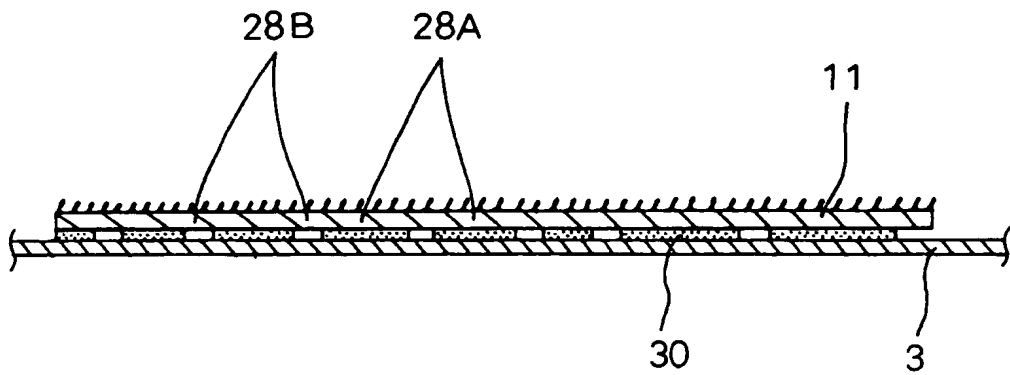


FIG. 4



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## EUROPEAN SEARCH REPORT

Application Number  
EP 96 30 5696 · 5

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP-A-0 532 805 (NITTA GELATIN INC.) * page 3, line 14 - line 56 * * page 4, line 46 - page 5, line 3; figures 1,6-13 *	1-3,6,7	A61F13/58
A	EP-A-0 491 347 (KIMBERLY-CLARK CORPORATION) * claims 1-8; figures 1-6 *	1,2,4,5	
A	WO-A-92 01759 (MINNESOTA MINING AND MANUFACTURING COMPANY) * page 3, line 14 - line 34; figures 1,2 *	1,6,7	
A	US-A-4 662 875 (THE PROCTER & GAMBLE COMPANY) * column 9, line 34 - column 11, line 11; figures 1-3 *	1,3,6	
A	US-A-4 810 574 (EXXON CHEMICAL PATENTS INC.) * claim 1 *	1,6	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A61F A44B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12 November 1996	Examiner Garnier, F
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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